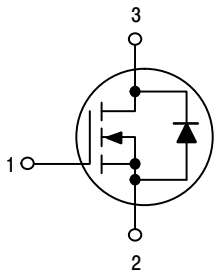
MOSFET – Power
170 mAmps, 100 Volts
N–Channel SOT–23

BSS123LT1G, BVSS123LT1G

170 mAMPS
100 VOLTS
$R_{DS(on)}$ = 6 Ω

N–Channel



Features

- HBM Class 0A, MM Class M1B (Note 4)
- BVSS Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC–Q101 Qualified and PPAP Capable
- These Devices are Pb–Free and are RoHS Compliant

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Drain–Source Voltage	V_{DSS}	100	Vdc
Gate–Source Voltage – Continuous – Non–repetitive ($t_p \le 50$ μs)	 V_{GS} V_{GSM}	 ±20 ±40	 Vdc Vpk
Drain Current – Continuous (Note 1) – Pulsed (Note 2)	 I_D I_{DM}	 0.17 0.68	Adc

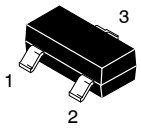
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

THERMAL CHARACTERISTICS

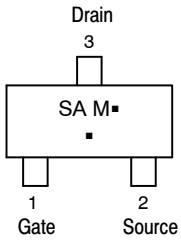
Characteristic	Symbol	Max	Unit
Total Device Dissipation FR–5 Board (Note 3) T_A = 25°C Derate above 25°C	P_D	 225 1.8	 mW mW/°C
Thermal Resistance, Junction–to–Ambient	$R_{\theta JA}$	556	°C/W
Junction and Storage Temperature	T_J, T_{stg}	–55 to +150	°C

1. The Power Dissipation of the package may result in a lower continuous drain current.
2. Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.
3. FR–5 = 1.0 × 0.75 × 0.062 in.
4. ESD between the gate and source serves only, no gate overvoltage rating is implied.

MARKING DIAGRAM & PIN ASSIGNMENT



SOT–23
CASE 318
STYLE 21



SA = Device Code
M = Date Code
▪ = Pb–Free Package

(Note: Microdot may be in either location)

*Date Code orientation and/or position may vary depending upon manufacturing location.

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 2 of this data sheet.

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ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Drain−Source Breakdown Voltage (V_{GS} = 0, I_D = 250 μAdc)	$V_{(BR)DSS}$	100	–	–	Vdc
Zero Gate Voltage Drain Current (V_{GS} = 0, V_{DS} = 100 Vdc) T_J = 25°C T_J = 125°C	I_{DSS}	 – –	 – –	 15 60	μAdc
Gate−Body Leakage Current (V_{GS} = 20 Vdc, V_{DS} = 0)	I_{GSS}	–	–	50	nAdc
ON CHARACTERISTICS (Note 5)					
Gate Threshold Voltage (V_{DS} = V_{GS}, I_D = 1.0 mAdc)	$V_{GS(th)}$	1.6	–	2.6	Vdc
Static Drain−Source On−Resistance (V_{GS} = 10 Vdc, I_D = 100 mAdc)	$r_{DS(on)}$	–	–	6.0	Ω
Forward Transconductance (V_{DS} = 25 Vdc, I_D = 100 mAdc)	g_{fs}	80	–	–	mmhos
DYNAMIC CHARACTERISTICS					
Input Capacitance (V_{DS} = 25 Vdc, V_{GS} = 0, f = 1.0 MHz)	C_{iss}	–	20	–	pF
Output Capacitance (V_{DS} = 25 Vdc, V_{GS} = 0, f = 1.0 MHz)	C_{oss}	–	9.0	–	pF
Reverse Transfer Capacitance (V_{DS} = 25 Vdc, V_{GS} = 0, f = 1.0 MHz)	C_{rss}	–	4.0	–	pF
SWITCHING CHARACTERISTICS(4)					
Turn−On Delay Time (V_{CC} = 30 Vdc, I_C = 0.28 Adc, V_{GS} = 10 Vdc, R_{GS} = 50 Ω)	$t_{d(on)}$	–	20	–	ns
Turn−Off Delay Time	$t_{d(off)}$	–	40	–	ns
REVERSE DIODE					
Diode Forward On−Voltage (I_D = 0.34 Adc, V_{GS} = 0 Vdc)	V_{SD}	–	–	1.3	V

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

5. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.

ORDERING INFORMATION

Device	Package	Shipping†
BSS123LT1G	SOT−23 (Pb−Free)	3,000 / Tape & Reel
BVSS123LT1G*	SOT−23 (Pb−Free)	3,000 / Tape & Reel
BSS123LT7G	SOT−23 (Pb−Free)	3,500 / Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

*BVSS Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC−Q101 Qualified and PPAP Capable.

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TYPICAL ELECTRICAL CHARACTERISTICS

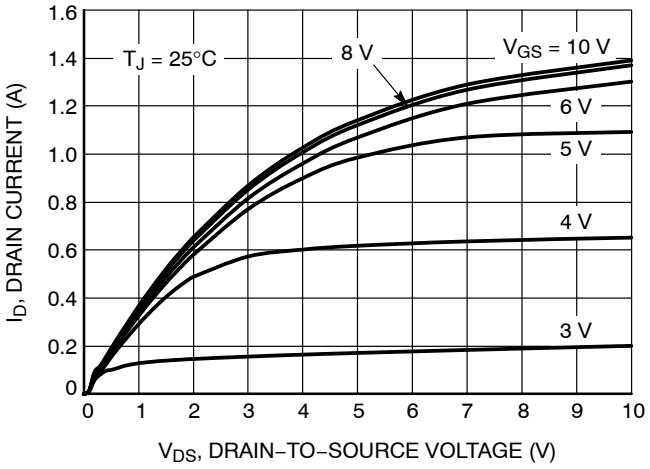


Figure 1. On−Region Characteristics

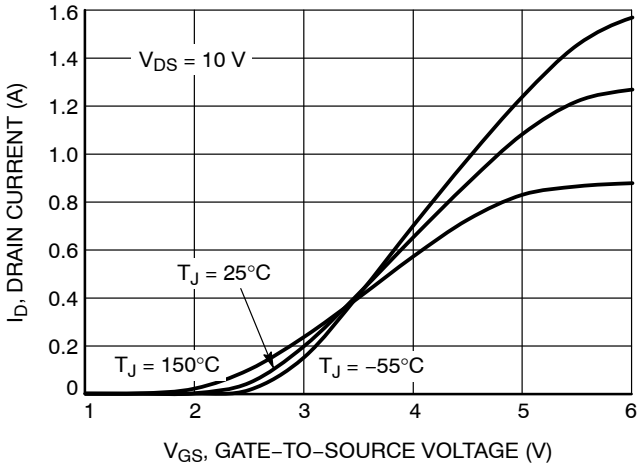


Figure 2. Transfer Characteristics

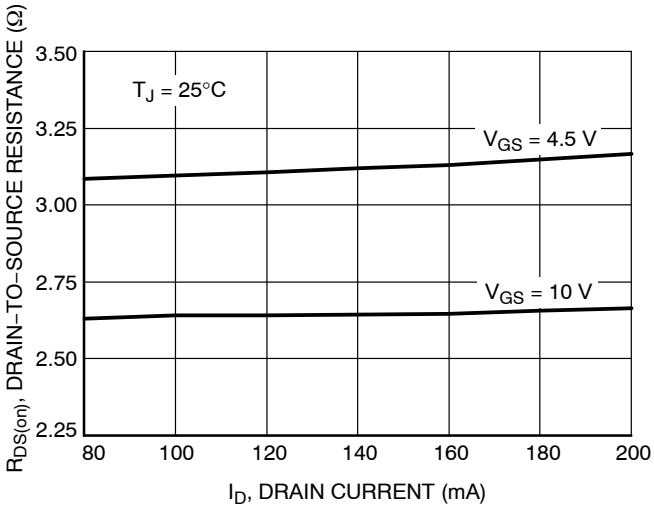


Figure 3. On−Resistance vs. Drain Current and Gate Voltage

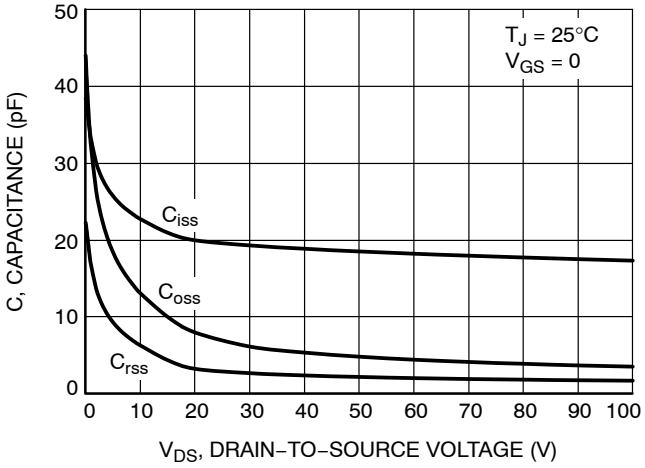


Figure 4. Capacitance Variation

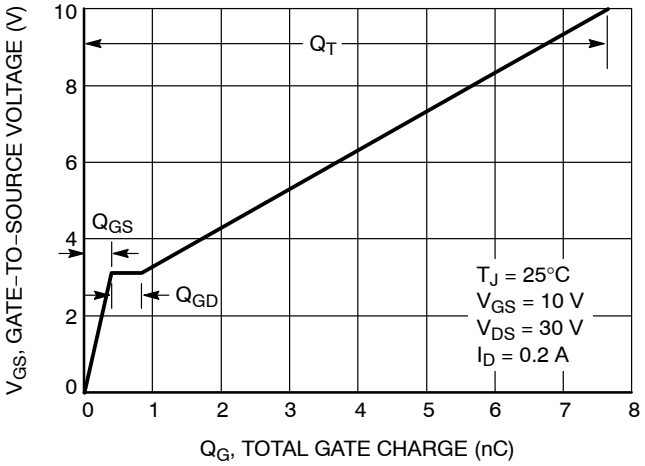


Figure 5. Gate−to−Source and Drain−to−Source Voltage vs. Total Charge

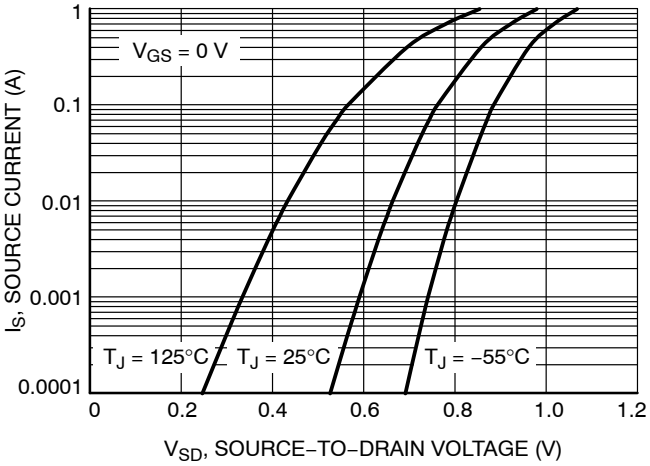


Figure 6. Diode Forward Voltage vs. Current

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TYPICAL ELECTRICAL CHARACTERISTICS

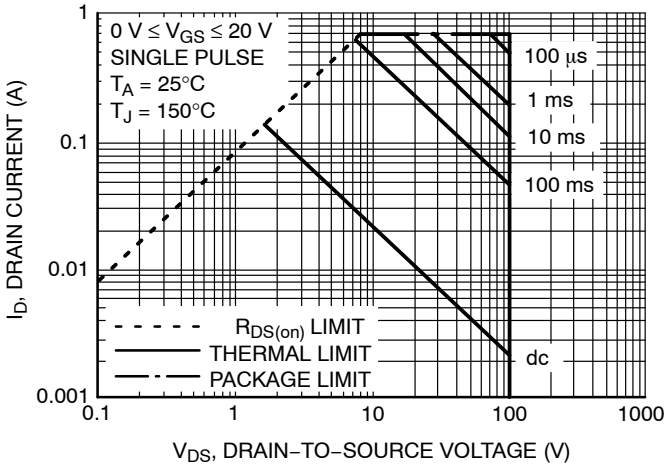


Figure 7. Maximum Rated Forward Biased Safe Operating Area

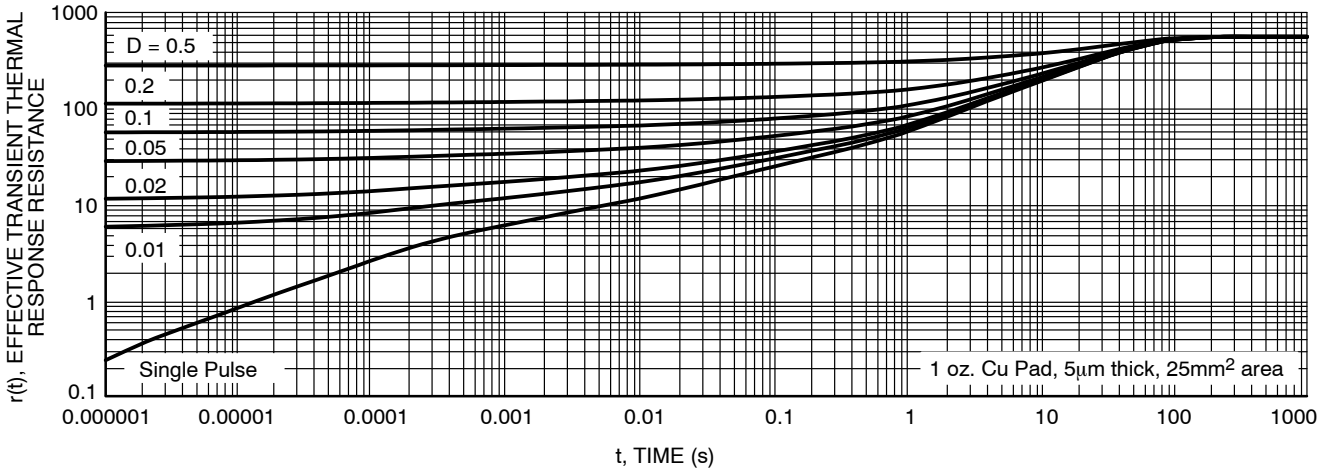
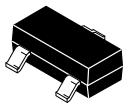


Figure 8. Thermal Response

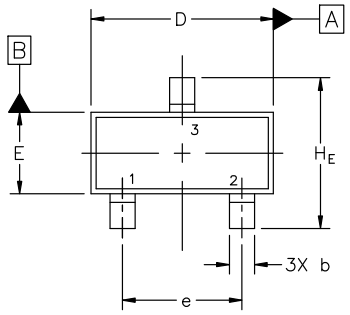
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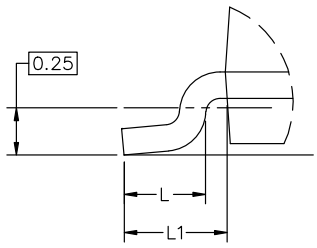
SCALE 4:1

SOT−23 (TO−236) 2.90x1.30x1.00 1.90P
CASE 318
ISSUE AU

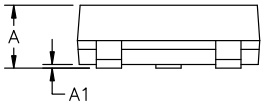
DATE 14 AUG 2024



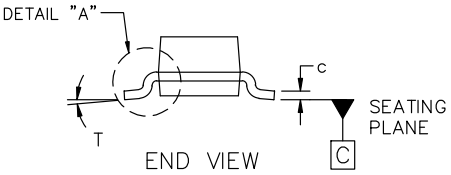
TOP VIEW



DETAIL "A"
Scale 3:1



SIDE VIEW

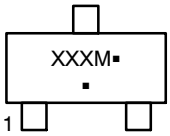


END VIEW

MILLIMETERS			
DIM	MIN	NOM	MAX
A	0.89	1.00	1.11
A1	0.01	0.06	0.10
b	0.37	0.44	0.50
c	0.08	0.14	0.20
D	2.80	2.90	3.04
E	1.20	1.30	1.40
e	1.78	1.90	2.04
L	0.30	0.43	0.55
L1	0.35	0.54	0.69
H_E	2.10	2.40	2.64
T	0°	−−−	10°

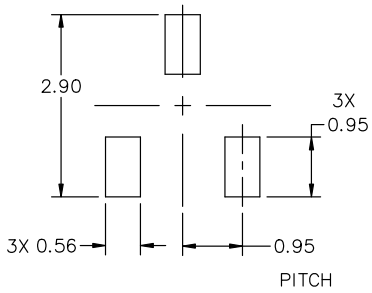
NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2018.
2. CONTROLLING DIMENSIONS: MILLIMETERS.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF THE BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

GENERIC
MARKING DIAGRAM*



XXX = Specific Device Code
M = Date Code
▪ = Pb−Free Package

*This information is generic. Please refer to device data sheet for actual part marking. Pb−Free indicator, "G" or microdot "▪", may or may not be present. Some products may not follow the Generic Marking.



RECOMMENDED
MOUNTING FOOTPRINT

* For additional information on our Pb−Free strategy and soldering details, please download the onsemi Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

STYLES ON PAGE 2

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CASE 318
ISSUE AU

DATE 14 AUG 2024

STYLE 1 THRU 5:
CANCELLED

STYLE 6:
PIN 1. BASE
2. EMITTER
3. COLLECTOR

STYLE 7:
PIN 1. EMITTER
2. BASE
3. COLLECTOR

STYLE 8:
PIN 1. ANODE
2. NO CONNECTION
3. CATHODE

STYLE 9:
PIN 1. ANODE
2. ANODE
3. CATHODE

STYLE 10:
PIN 1. DRAIN
2. SOURCE
3. GATE

STYLE 11:
PIN 1. ANODE
2. CATHODE
3. CATHODE−ANODE

STYLE 12:
PIN 1. CATHODE
2. CATHODE
3. ANODE

STYLE 13:
PIN 1. SOURCE
2. DRAIN
3. GATE

STYLE 14:
PIN 1. CATHODE
2. GATE
3. ANODE

STYLE 15:
PIN 1. GATE
2. CATHODE
3. ANODE

STYLE 16:
PIN 1. ANODE
2. CATHODE
3. CATHODE

STYLE 17:
PIN 1. NO CONNECTION
2. ANODE
3. CATHODE

STYLE 18:
PIN 1. NO CONNECTION
2. CATHODE
3. ANODE

STYLE 19:
PIN 1. CATHODE
2. ANODE
3. CATHODE−ANODE

STYLE 20:
PIN 1. CATHODE
2. ANODE
3. GATE

STYLE 21:
PIN 1. GATE
2. SOURCE
3. DRAIN

STYLE 22:
PIN 1. RETURN
2. OUTPUT
3. INPUT

STYLE 23:
PIN 1. ANODE
2. ANODE
3. CATHODE

STYLE 24:
PIN 1. GATE
2. DRAIN
3. SOURCE

STYLE 25:
PIN 1. ANODE
2. CATHODE
3. GATE

STYLE 26:
PIN 1. CATHODE
2. ANODE
3. NO CONNECTION

STYLE 27:
PIN 1. CATHODE
2. CATHODE
3. CATHODE

STYLE 28:
PIN 1. ANODE
2. ANODE
3. ANODE

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